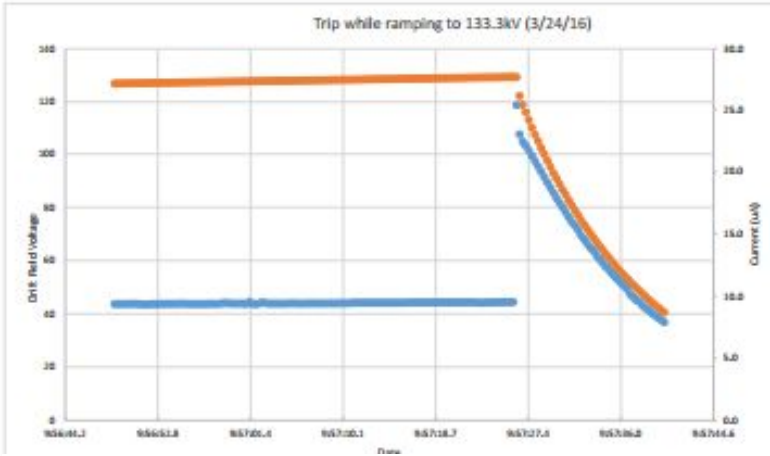
35t Status and Noise Update

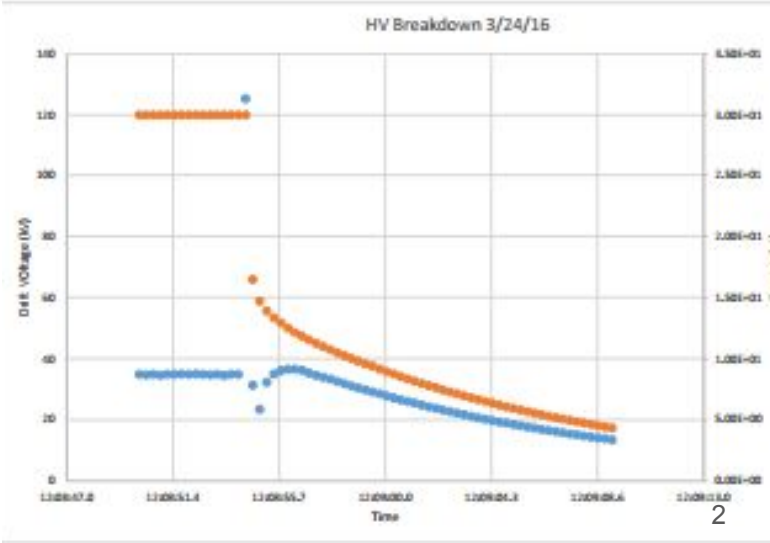
20160330 - 35t - B.Kirby

High Voltage Status - A. Hahn

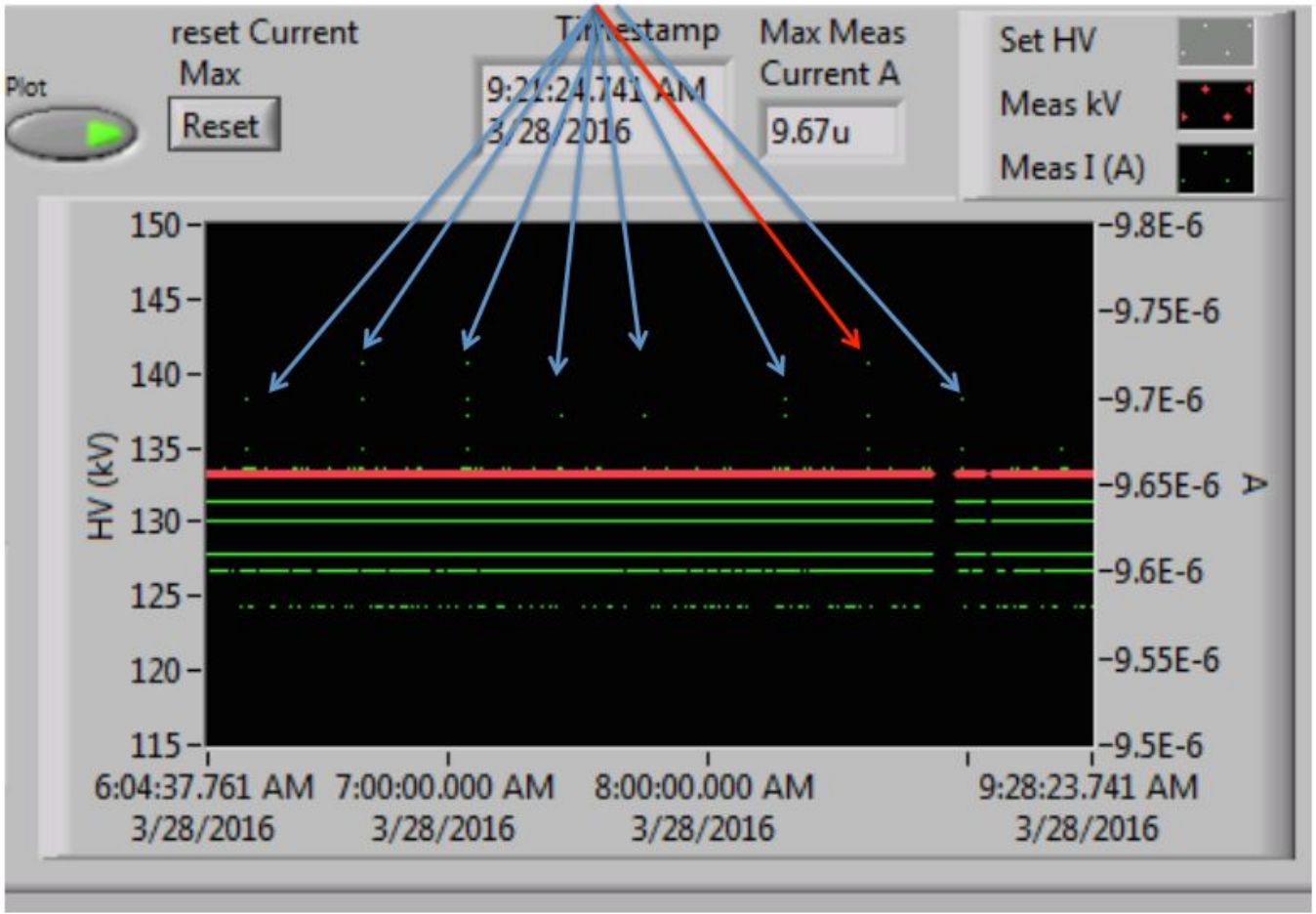
High Voltage

- We were at 90 kV (375 V/cm) at time of last meeting.
- Attempts to raise the Cathode HV to 120 kV (500 V/cm) = 133.3 kV @ PS on Thursday were unsuccessful
  - Two trips, first at ~130 kV, second at 108 kV
    - Second trip we actually heard—suspect it was external to tank, nearby the PS or the first filter
    - Knocked out one of the Video Cameras—but no other camera actually saw anything
      - Camera rack is nearby the first HV filter, so that may be correlated??
  - Decided to think about it.
  - Set back to 90 kV on the Cathode—that held ok
- On Friday decided to find where it would hold
  - Raised HV ~10 kV per step, and waited to see if it would hold.
  - By the end of day we were at 120 kV!



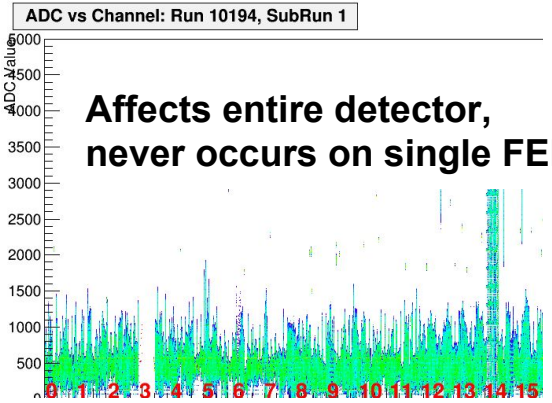


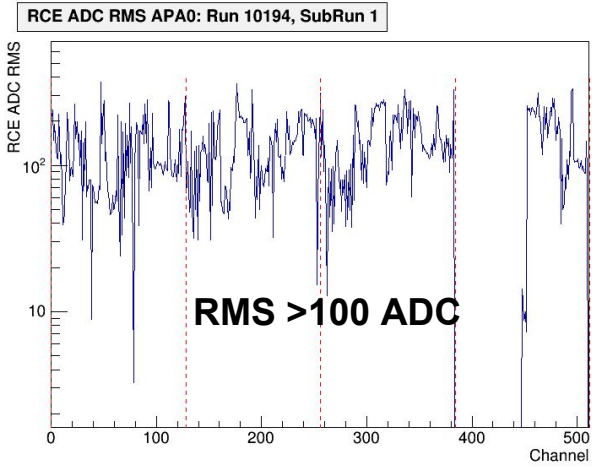
“Nano” Discharges(??) @ 120 kV



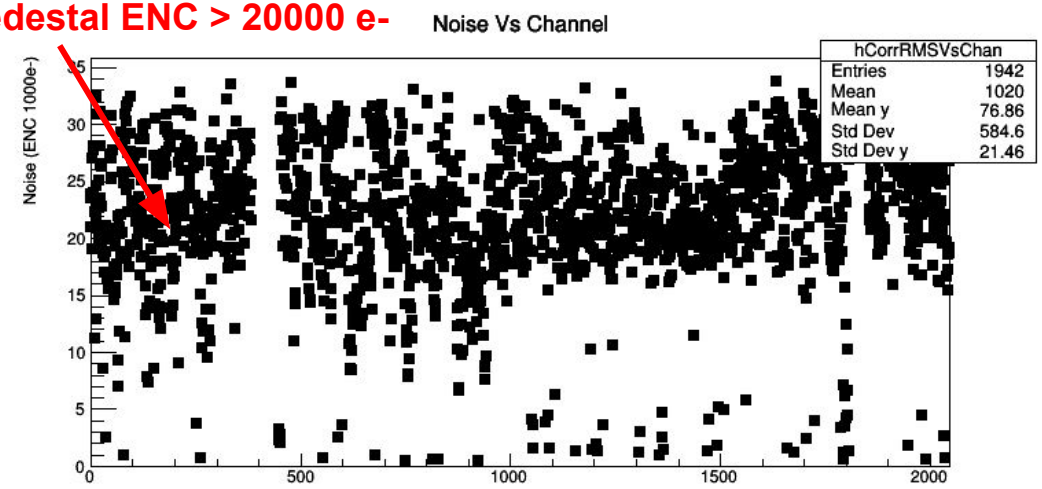
A.Hahn

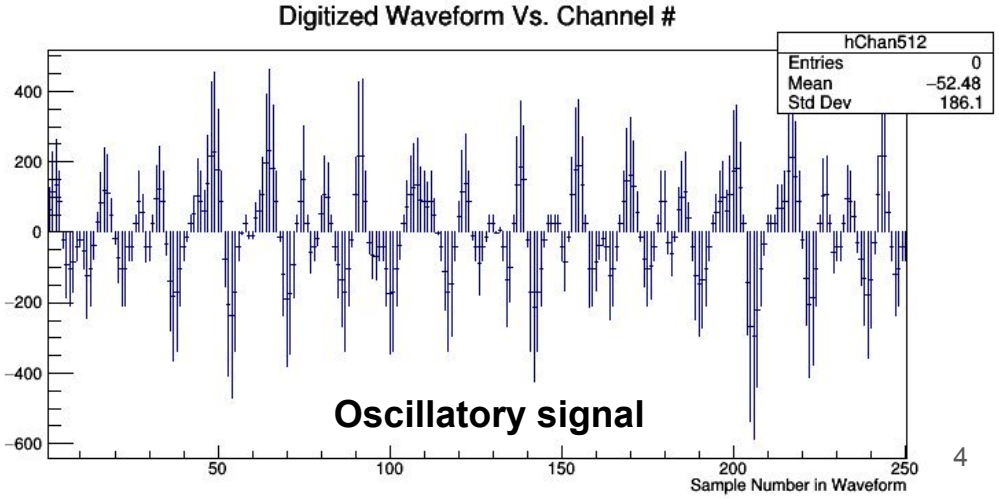
“High Noise” State



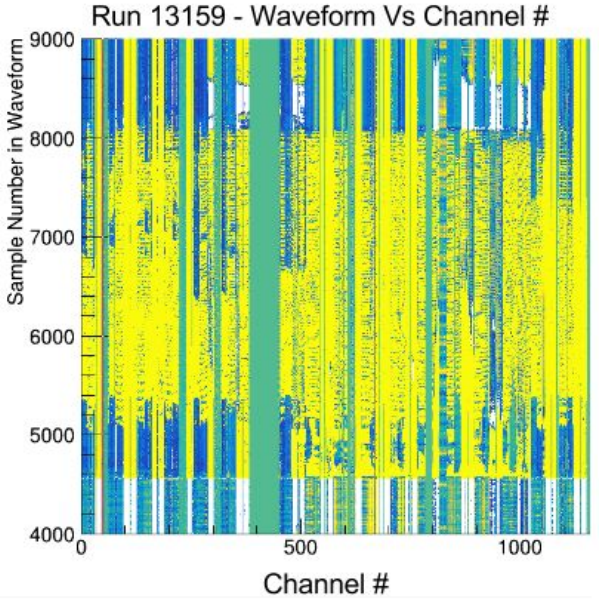


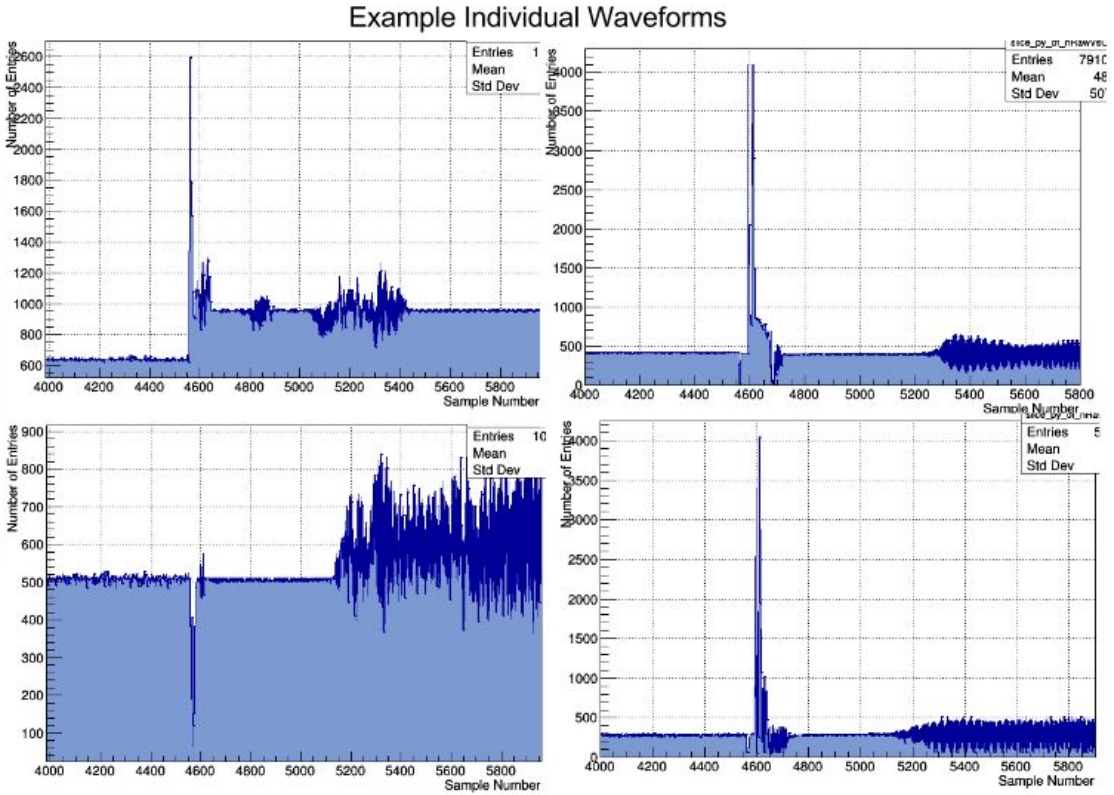
Pedestal ENC > 20000 e-





Reminder - High-Noise State in Data





Run 13159 recorded state of high noise state

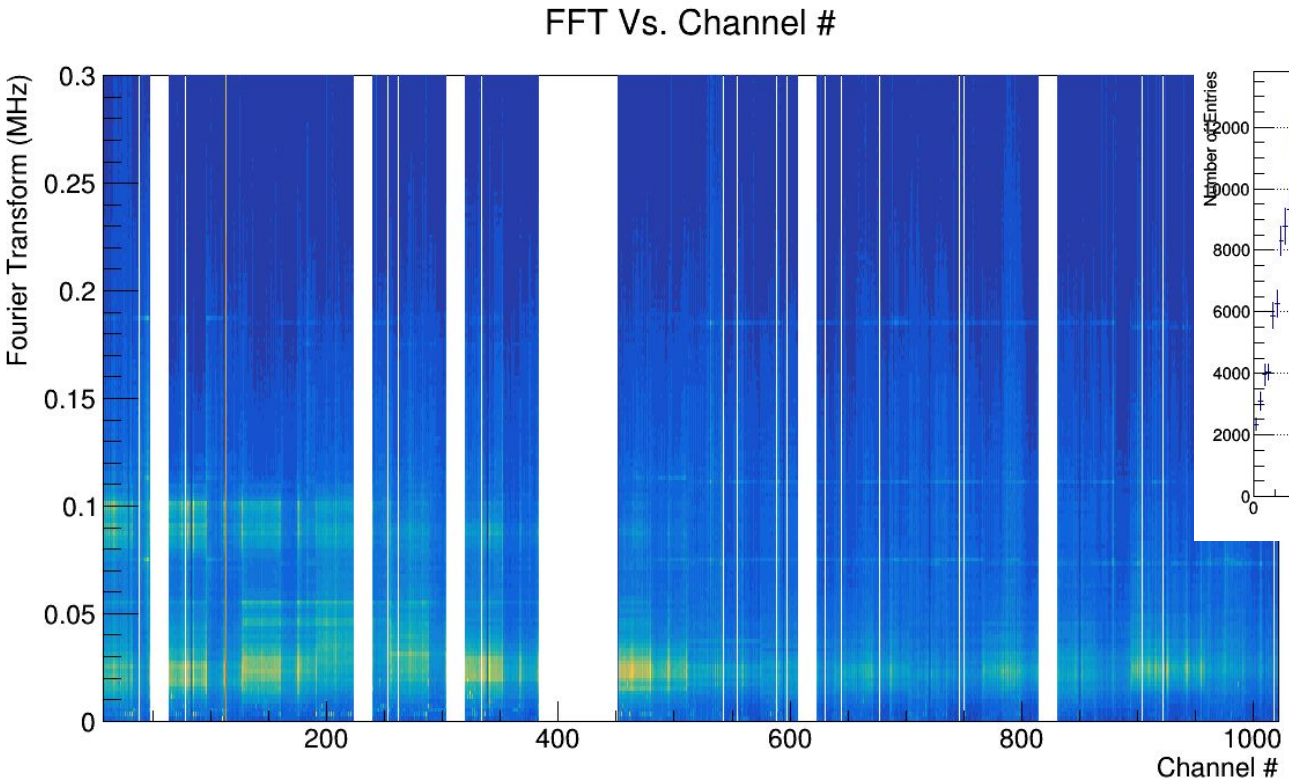
Something simultaneously saturates nearly all channels, high noise starts ~2ms after

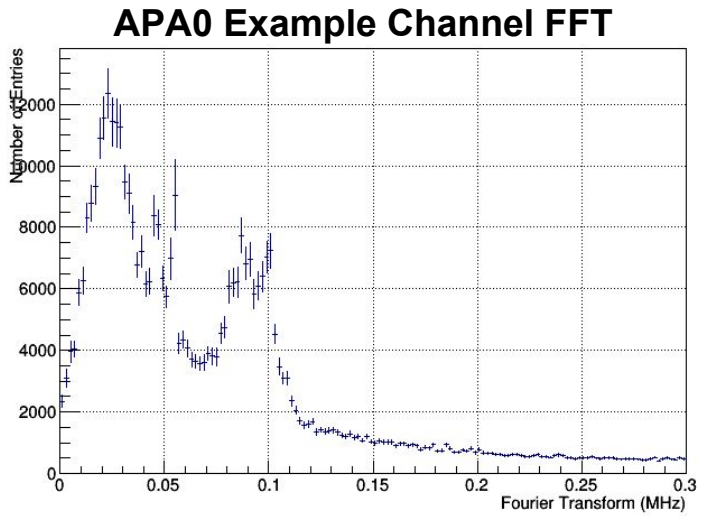
“High Noise State” Update - N.Barros

Noise vs HV

- There is circumstantial evidence that noise increased with HV drift
  - At 60 kV : No noise transitions (according to Alex)
  - At 90 kV : Short lived high noise and would recover on its own
  - At 120 kV : Often in high noise and only recovered when power cycling ASICs
- FEMB 9,10,12-15 were not being used (channel A powered off)
- Power cycling FEMB-00 was enough to recover low noise
- When started running with only RCE00,04 and 08 high noise became state less common
  - One FEMB per APA (except APA3)
  - Still doesn’t recover on its own.

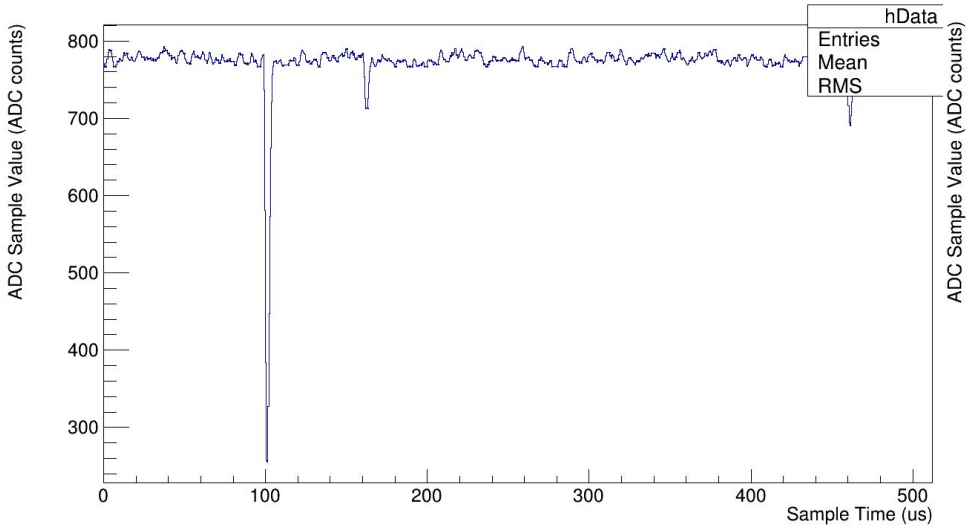
35t Noise - FFT and ~100kHz Modes on APA0

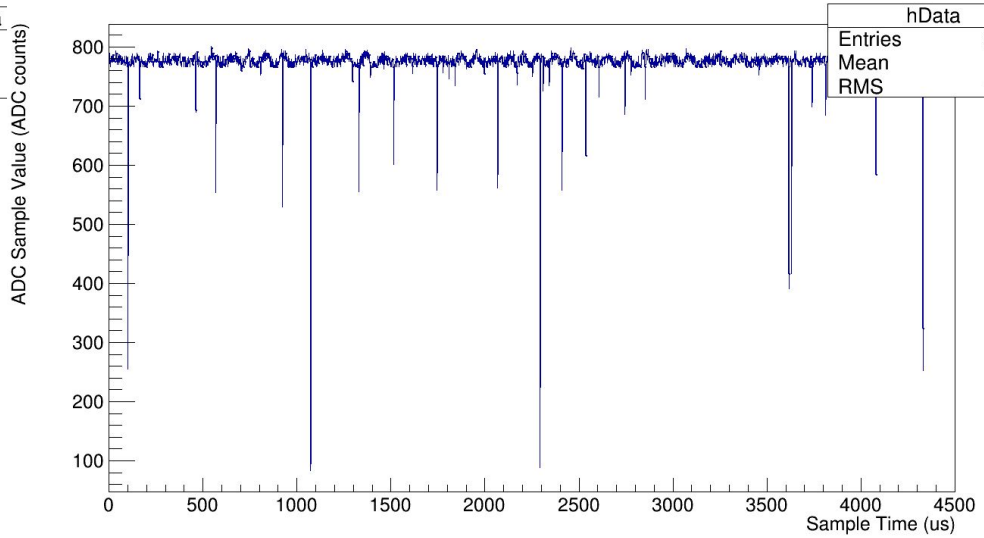




-APA0 is the “noisiest”, 3000e- on collection wires
-~4300e- on induction wires
-has a contribution at ~100kHz not seen on other APAs

Reminder - APA0 Signals at Nominal Wire Bias





- Room temperature wire-bias tests performed in cryostat Oct 2015
- See frequent negative pulse signals in readout with nominal wire bias and 100pA leakage setting on APA0

Noise Plans

- Requested running with a single FEMB with ASICs turned on
  - Determine frequency of high noise states, see if there's a significant difference between boards
- Try reducing supply voltage to ASIC regulators
- Dedicated noise tests at Fermilab next week
  - List of tests has been compiled